Robust Object Recognition in Service Robotics

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Abstract

Classification of visual information is a common task in machine vision systems, especially in service robotics applications where the surrounding environment is composed of clutter scenes with a large number of objects visualized in variable illumination conditions. This paper presents a robust detection and classification method of objects in rehabilitation robotics scenarios. The objects of interest are separated from the scene's background using a robust segmentation method. The proposed method uses no *a priori* information regarding the characteristics of the objects to be segmented. Its output is a sequence of binary images containing different blobs representing different segmented objects and noise. In order to distinguish between the various results found in the sequence of binary images a classification method had to be developed. For this purpose a SVM (*Support Vector Machines*) approach was used. The developed classifier was trained off-line with different general purpose features describing typical objects from the visualized scene (e.g. meal-trays, bottles, glasses etc.). According to the values of the features the objects are separated to different classes. During on-line functioning of the proposed system the different extracted shapes are assigned to their specific class or to noise. The proposed algorithm has been applied to the recognition of objects of interest in the working scenarios of the rehabilitation robotic system FRIEND.